

MEMS Sensor Arrays for Cryogenic Propellant Applications, Phase I

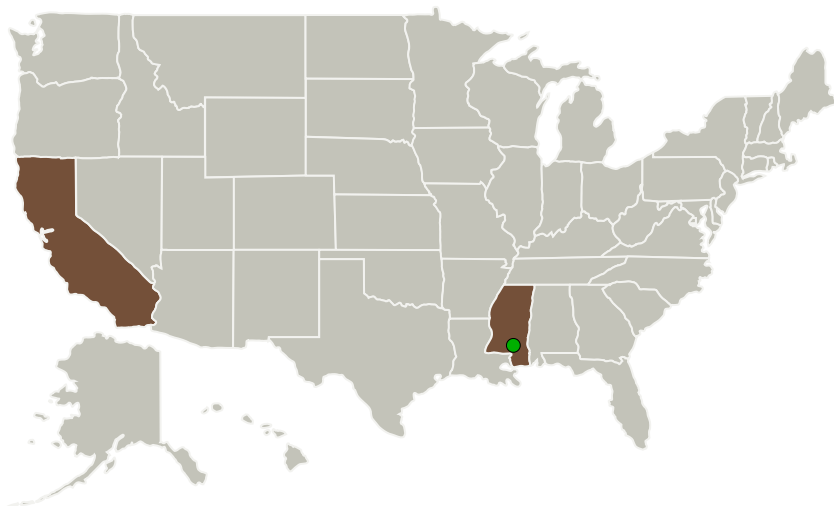
Completed Technology Project (2015 - 2015)



Project Introduction

KWJ offers this proposal for a low-power, practical and versatile MEMS sensor platform for NASA applications. The proposed nano-sensor platform is ultra-low power with sub-millisecond electrical response time for thermal conductivity operation. Integration with Pd surface functionalization will lead to enhanced performance for hydrogen sensing and selectivity with helium, while SiC structures can lead to enhanced hydrogen sensing. The KWJ MEMS platform has unique characteristics of small thermal mass and ultra-fast sensor response. The rapid stabilization allows very short operating duty cycles thereby extending battery life while communicating the output in near-real time. The miniature platform enables distributed and stand-alone sensing at low cost and virtually no maintenance and can be integrated with energy harvesting technology for long term remote operation. This adaptable array technology can be employed for detection of hydrogen, oxygen, methane, helium and other hydrocarbons and cryogenic propellants for NASA. In addition to cryogenic system leak detection the platform can address trace levels of nitrogen and water in gaseous helium purge streams. This platform technology offers multiple possibilities for sensor functionality and will create spin-offs for NASA, industrial and medical applications.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
KWJ Engineering, Inc	Lead Organization	Industry	Newark, California
● Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi

Primary U.S. Work Locations

California	Mississippi
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Project Transitions

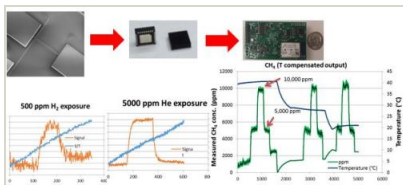
▶ **June 2015:** Project Start

✔ **December 2015:** Closed out

Closeout Documentation:

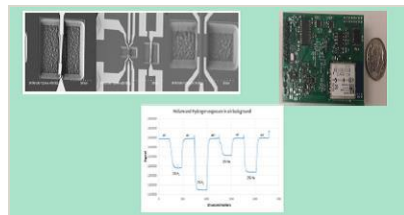
- Final Summary Chart(<https://techport.nasa.gov/file/139208>)

Images



Briefing Chart

MEMS Sensor Arrays for Cryogenic Propellant Applications Briefing Chart
(<https://techport.nasa.gov/image/126957>)



Final Summary Chart Image

MEMS Sensor Arrays for Cryogenic Propellant Applications, Phase I Project Image
(<https://techport.nasa.gov/image/131486>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

KWJ Engineering, Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

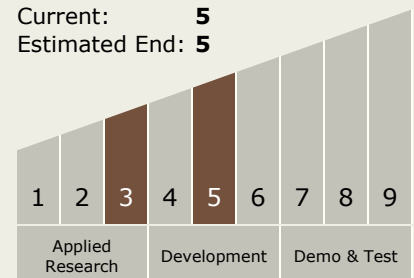
Carlos Torrez

Principal Investigator:

Joseph R Stetter

Technology Maturity (TRL)

Start: 3
Current: 5
Estimated End: 5



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Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
 - └ TX13.2 Test and Qualification
 - └ TX13.2.2 Propulsion, Exhaust, and Propellant Management

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System